

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of claims:

Claims 1-12 (Canceled)

12
13. (Amended) The assembly as set forth in claim 14, wherein the semi-spherical head of the screw further includes a recess formed therein for receiving therein a screwdriving tool such that the screw may be advanced into a vertebral bone.

12 14. (Amended) An orthopedic device for securing immobilizing structures to sequences of bone, comprising:

a screw having a semi-spherical head and a threaded shaft;

12
a coupling element having an axial hole extending therethrough, a portion of the axial hole defining an interior volume for receiving therein the semi-spherical head of the screw such that the threaded shaft may be moved through a variety of angles relative to the axial hole, the coupling element further including at least one slot rendering at least the interior volume deformable, the coupling element further including a tapered exterior surface, the coupling element further comprising a two-part interlocking coupling element including:

a socket portion containing the interior volume, the interior volume being semi-spherical shaped, the socket portion further including upper and lower sections, and at least one vertical slot formed in each of the upper and lower sections, at least one of the

slots rendering the interior volume deformable, the lower section having the tapered exterior surface; and

a cap portion having an opening in a bottom thereof and an interior chamber extending upwardly therefrom for joining with, and slideably retaining therein, the upper section of the socket portion;

a receiving member including a through hole having an interior wall surface, a portion of the interior wall surface of the through hole being shaped to receive the coupling element and the screw when the semi-spherical head of the screw is mounted within the coupling element; and

wherein advancement of the screw through the through hole relative to the receiving member when the exterior surface of the coupling element engages the interior wall surface of the through hole prevents the coupling element from further advancement through the hole, preventing the semi-spherical head of the screw from advancing further through the through hole, and causing locking of the screw relative to both the coupling element and to the receiving member thereby locking the angle of the screw relative to the axial hole.

12

14 15. (Amended) The assembly as set forth in claim 14, wherein the cap portion further includes a threading.

16. (Canceled)

16 ¹⁵ 17. (Amended) The assembly as set forth in claim 18, wherein the semi-spherical head of the fixation element further includes a recess formed therein for receiving therein a screwdriving tool such that the fixation element may be advanced into a vertebral bone.

15 18. (Amended) An orthopedic implant apparatus comprising:
a fixation element having a semi-spherical head and a shaft extending therefrom;
a receiving member including an axial bore defined by an interior surface wall, a portion of the axial bore having a tapered portion;
a socket portion having a semi-spherical interior volume for receiving therein the semi-spherical head, and an exterior surface capable of nesting against the interior surface wall of the tapered portion, the socket portion being located in the axial bore of the receiving member, the socket portion further including:
upper and lower socket sections, and at least one vertical slot formed in at least one of the upper or lower sections, the at least one slot rendering the spherical interior volume deformable, where the exterior surface of the socket portion is tapered and located on the lower section; and
a cap portion having an opening in a bottom thereof and an interior chamber extending upwardly therefrom for joining with, and slideably retaining therein, the upper socket portion;
wherein the semi-spherical head is rotationally freely mounted within the semi-spherical interior volume of the socket portion prior to the socket portion being forcibly advanced against the interior surface wall of the tapered portion, and whereby

after forcible advancement of the socket portion causes the fixation element, the socket portion and the receiving member to be locked relative to one another.

15
17 19 (Amended) The assembly as set forth in claim 18, wherein the cap portion further includes a threading.

18 20 (Amended) An orthopedic implant apparatus comprising:
a fixation element having a semi-spherical head, having a lower and upper curvate surface, and a threaded shaft extending from the semi-spherical head;
a receiving member including an axial bore defined by an interior surface wall,
the axial bore having a lower portion and an upper threaded portion;
a socket portion containing the semi-spherical head of the fixation element therein
and having a lower socket portion and a threaded upper socket portion, the socket portion being moveably located in the axial bore;
wherein the lower socket portion has an interior volume defined by an interior surface which receives the lower curvate surface of the semi-spherical head, such that the threaded shaft is inserted through a hole in the interior surface and is capable of being moved through a variety of angles relative to the socket portion, the lower socket portion further including an exterior surface which seats against the interior surface wall of the lower portion, the lower socket portion further including at least one vertical slot rendering the interior volume deformable; and
the threaded upper socket portion comprising a cap portion having an opening in a bottom thereof and an interior chamber extending upwardly therefrom for joining with.

and slidably retaining therein, the lower socket portion, disposed above the upper curvate surface of the semi-spherical head of the fixation element, whereby downward pressure on the cap portion causes compression of the lower curvate surface against the interior surface of the lower socket portion to lock the fixation element relative to the socket portion, causing the upper and lower socket portions, the semi-spherical head of the fixation element, and the receiving member to be locked relative to one another.

18

19 ~~21~~ ¹⁸ The assembly as set forth in claim 20, wherein the semi-spherical head of the fixation element further includes a recess formed therein for receiving therein a screwdriving tool such that the fixation element may be threadably advanced into a vertebral bone.

Claims 22-30 (Canceled)

21 ~~31~~ A bone anchor and coupling member assembly wherein said coupling member is capable of being selectively positioned and locked at a plurality of angles relative to the bone anchor, said assembly comprising:

a bone anchor having a curvate head;

a coupling member having an axial bore for receiving said curvate head, said bore having an interior surface, and a channel formed therein for receiving an elongate member, at least a portion of said channel being in spatial communication with said bore;

a first intervening member positioned between the curvate head in the bore and an elongate member positioned in said channel; and

a second intervening member positioned in the bore between said curvate head and said interior surface,

wherein a force applied to said first intervening member urges said curvate head to translate axially within said bore and into locking contact with said second intervening member.

21
22 ~~32~~ The assembly of claim ~~31~~, wherein said curvate head is semi-spherical.

21
23 ~~33~~ The assembly of claim ~~31~~, wherein said bore includes at least two portions having different diameters.

23
24 ~~34~~ The assembly of claim ~~33~~, wherein said second intervening member is positioned within one of said portions having different diameters.

21
25 ~~35~~ The assembly as set forth in claim ~~31~~, wherein said second intervening member circumferentially retains the curvate head.

21
26 ~~36~~ The assembly as set forth in claim ~~31~~, wherein the force applied to said first intervening member is provided through the elongate member positioned in the channel.

27 ~~37~~ (Amended) An orthopedic device comprising:
a screw having a semi-spherical head and a threaded shaft.

a coupling element having an axial hole extending therethrough for receiving therein the semi-spherical head of the screw such that the screw may be moved through a variety of angles relative to the axial hole, the coupling element further including at least one slot; and

a receiving member including a through hole having an interior wall surface, a portion of the interior wall surface of the through hole being shaped to receive the coupling element and the screw when the semi-spherical head of the screw is mounted within the coupling element.

wherein engagement of the coupling element and the interior wall surface selectively prevents the screw from moving relative to the axial hole, thereby locking the angle of the screw relative to the axial hole.

27

28 38. The orthopedic device as set forth in claim 37, wherein the semi-spherical head of the screw further includes a recess formed therein for receiving therein a screwdriving tool such that the screw may be advanced into a vertebral bone.

39. (Canceled)

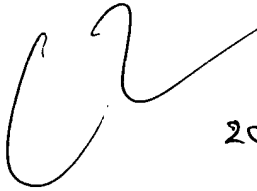
27

29 40. The orthopedic device as set forth in claim 37 wherein the interior wall surface of the receiving member is tapered.

30 ²⁷ ~~41~~ (Amended) The orthopedic device as set forth in claim ~~37~~ wherein the interior wall surface of the receiving member and the exterior surface of the coupling element are tapered.

31 ²⁷ ~~42~~ The orthopedic device as set forth in claim ~~37~~ wherein coupling element axial hole has a concave surface conforming to the semi-spherical screw head.

Claims 43-47 (Canceled)

 20 ¹⁸ ~~48~~ (New) The implant apparatus of claim 20 further comprising a locking nut engageable with the upper threaded portion of the receiving member, tightening of the locking nut with respect to the receiving member exerting a downward force onto a rod disposed in the receiving member such that the rod exerts a downward force on the cap portion.
